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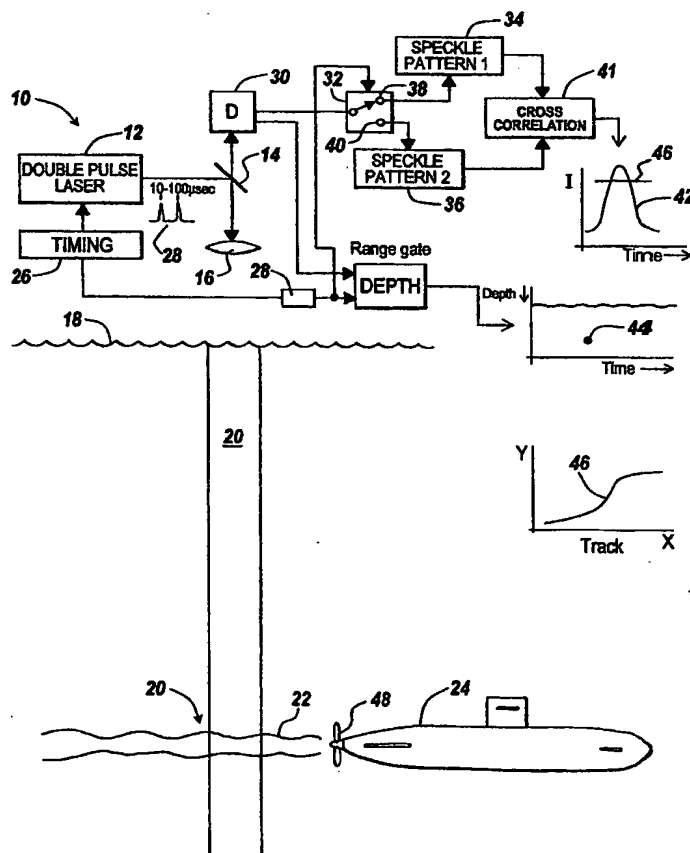
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(54) Title: **METHOD AND APPARATUS FOR DETECTING SUBMARINES**



(57) Abstract: A method for detecting, tracking and locating submarines (24) utilizes pulsed coherent radiation from a laser (12) that is projected down through a water column, with particles in the water producing speckle from backscatter of the random particle distribution, with correlation of two closely time-spaced particle-based speckle patterns providing an intensity measurement indicative of the presence of a submarine. Subsurface submarine movement provides a subsurface wake which causes movement of particles such that two closely-spaced "snapshots" of the returns from particles in the same water column can detect particle movement due to the wake. The magnitude of the speckle pattern change indicates particle movement. In one embodiment, the return signals are imaged onto an intensified CCD or APA array that capture two successive laser pulses through the utilization of dual pixel registered cameras. Note that in the subject system, phase information is converted to measurable intensity information relating to particle motion.